

**CLAIMS**

**What is Claimed is:**

- 5           1.     A method of pacing a patient's heart using an implantable  
cardiac stimulation device, the method comprising:  
            pacing the heart at a selected pacing rate;  
            monitoring for intrinsic heart beats; and  
            increasing the pacing rate if at least two intrinsic heart beats  
10           are detected within a predefined period.
2.     The method of claim 1 wherein the predefined period  
extends for a predetermined number of overdrive paced cycles.
- 15           3.     The method of claim 1 wherein the predefined period  
commences with a first detected intrinsic beat.
4.     The method of claim 1 wherein the predefined period ranges  
between about 8 and about 40 cycles.
- 20           5.     The method of claim 1 wherein the predefined period begins  
with a first paced beat.
6.     The method of claim 1 wherein the predefined period is  
25           about 10 cycles.
7.     The method of claim 1 further comprising decreasing the  
overdrive pacing rate by a determined rate decrement if at least two  
intrinsic heart beats are not detected within a second predefined period.
- 30           8.     The method of claim 7 wherein the second predefined  
period begins following an increase in the overdrive pacing rate.

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9. The method of claim 7 wherein the second predefined period is between about 8 and about 40 cycles.

5 10. The method of claim 1 wherein increasing the pacing rate comprises increasing the pacing rate between about 5 and about 25 paces per minute.

10 11. The method of claim 7 wherein the determined rate decrement ranges between about 1 and about 5 paces per minute.

12. The method of claim 1 further comprising:  
determining a sinus rate; and  
setting the selected pacing rate to be equal to the sinus rate.

15 13. The method of claim 11 wherein determining the sinus rate comprises:  
detecting at least three consecutive sinus P-waves;  
determining an average interval between the P-waves; and  
20 calculating the sinus rate based upon the average interval.

25 14. The method of claim 11 further comprising periodically re-determining the selected pacing rate by:  
suspending pacing at the selected pacing rate;  
detecting at least three consecutive P-waves while pacing is suspended;  
determining an updated sinus rate based upon the at least three consecutive P-waves; and  
30 setting the selected pacing rate based upon the updated sinus rate.

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15. The method of claim 1 further comprising:  
determining an atrial rate; and  
setting the selected pacing rate to be equal to the atrial rate.
- 5 16. The method of claim 15 further comprising:  
periodically determining an updated atrial rate;  
comparing the updated atrial rate with a current pacing rate;  
and  
if the updated atrial rate exceeds the current pacing rate by  
10 a determined amount, resetting the selected pacing rate to be  
equal to the updated atrial rate.
17. A system for controlling pacing of a heart using an  
implantable cardiac stimulation device configured for connection to a  
15 patient's heart, the system comprising:  
means for determining an overdrive pacing rate;  
means for pacing the heart at the overdrive pacing rate;  
means for detecting intrinsic heart beats while pacing; and  
means, responsive to detection of at least two intrinsic heart  
20 beats within a predefined period, for increasing the overdrive  
pacing rate.
18. An implantable cardiac stimulation device for controlling  
pacing of a patient's heart, the system comprising:  
25 a determination unit that is operative to determine an  
overdrive pacing rate;  
an overdrive pacing unit that is operative to pace the  
patient's heart at the overdrive pacing rate;  
a detection unit that is operative to detect intrinsic heart  
30 beats; and

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an increment unit that is operative to increase the overdrive pacing rate in response to detection of at least two intrinsic heart beats within a predefined period.

5           19.    The device of claim 18 wherein the predefined period extends for a predetermined number of overdrive paced cycles.

10           20.    The device of claim 18 wherein the predefined period begins with a first detected intrinsic beat.

15           21.    The device of claim 18 wherein the predefined period ranges between about 8 and about 40 cycles.

20           22.    The device of claim 18 wherein the predefined period begins with a first paced beat.

25           23.    The device of claim 18 wherein the predefined period is about 10 cycles.

30           24.    The device of claim 18 wherein the increment unit is further operative to decrease the overdrive pacing rate by a determined rate decrement if at least two intrinsic heart beats are not detected within a second predefined period.

35           25.    The device of claim 24 wherein the second predefined period begins following an increase in the overdrive pacing rate.

40           26.    The device of claim 24 wherein the second predefined period is between about 8 and about 40 cycles.

45           27.    The device of claim 18 wherein the increment unit increases the pacing rate by about 5 to about 25 paces per minute.

28. The device of claim 24 wherein the determined rate decrement ranges between about 1 and about 5 paces per minute.

5           29. The device of claim 18 wherein the determination unit calculates the overdrive pacing rate as a function of an intrinsic pacing rate.

10           30. A method of pacing a patient's heart using an implantable cardiac stimulation device, the method comprising:  
            pacing the heart at a selected pacing rate;  
            monitoring for intrinsic heart beats; and  
            increasing the pacing rate by a predetermined increment if  
            at least two intrinsic heart beats are detected within a predefined  
15           period.

            31. The method of claim 30 wherein the predefined period extends for a predetermined number of paced cycles.

20           32. The method of claim 30 wherein the predefined period commences with a first detected intrinsic beat.

            33. The method of claim 30 wherein the predefined period ranges between about 8 and about 40 cycles.

25           34. The method of claim 30 wherein the predefined period begins with a first paced beat.

            35. The method of claim 30 wherein the predefined period  
30           comprises a predefined period of time.

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36. An implantable cardiac stimulation device for pacing a patient's heart, the system comprising:

a determination unit that is operative to determine an overdrive pacing rate;

5 an overdrive pacing unit that is operative to pace the patient's heart at the overdrive pacing rate;

a detection unit that is operative to detect intrinsic heart beats; and

10 an increment unit that is operative to increase the overdrive pacing rate by a predetermined increment in response to detection of at least two intrinsic heart beats within a predefined period.

37. The device of claim 36 wherein the predefined period extends for a predetermined number of cycles.

15 38. The device of claim 36 wherein the predefined period ranges between about 8 and about 40 cycles.

20 39. The device of claim 36 wherein the predefined period is about 10 cycles.

40. The device of claim 36 wherein the predefined period comprises a predefined period of time.